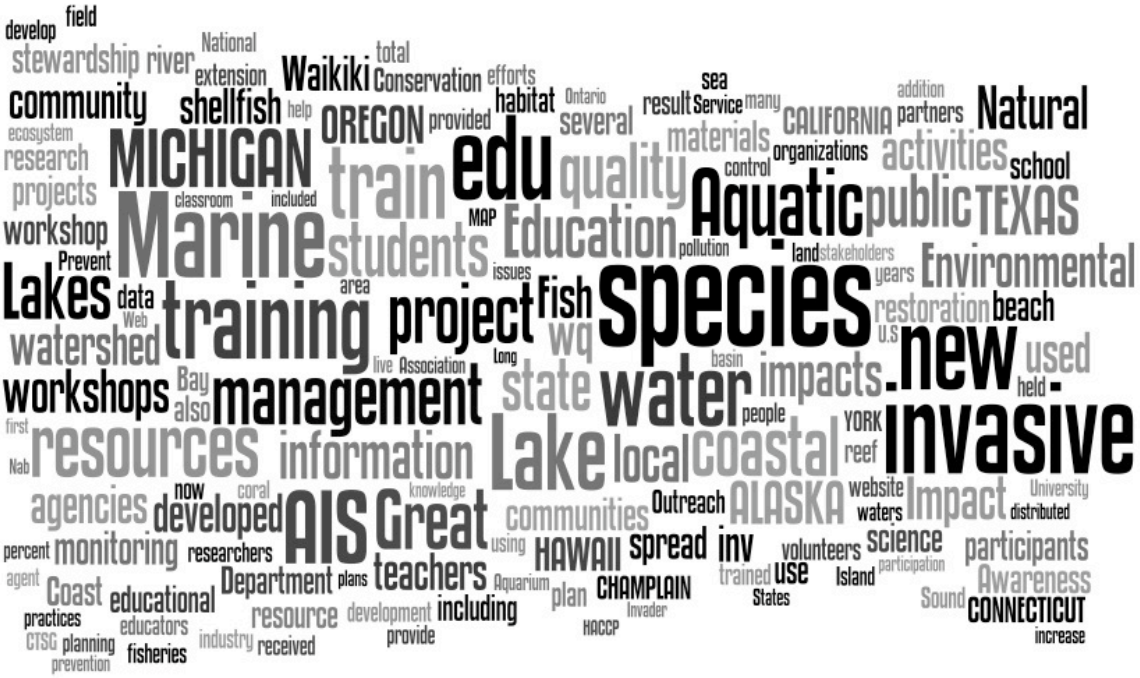
HEALTHY COASTAL ECOSYSTEMS FOCUS TEAM

EDUCATION IMPACTS

OCTOBER 2009



1101 ALASKA: Alaska Sea Grant got the word out in local newspaper columns

Activity: (Brewer) The Alaska Sea Grant Marine Advisory Program provided seven newspaper columns that were published under the banner Octopus Ink in the Dutch Harbor Fisherman, a local paper with about 900 weekly buyers, and an estimated total circulation of 3,000. Selected columns were subsequently also published in the Anchorage Daily News, Tundra Drums, Cordova Times, Bristol Bay Times, The Fishermen's News, and several fishing trade news Web sites. Impact Statement: Referring to the article "True differences between white and red king salmon" one reader said "this is the best explanation of this topic I have read and encourage others to read it." Other articles like "Responsible wildlife viewing" have changed how people think about wildlife charters. Chris Graves of Suregood Adventures said "I always knew there were rules about how close you could be to a whale when doing charters, but I didn't know why until I read about it in the paper." *[A/152-20 (edu)]*

1106 ALASKA: Alaska Sea Grant helped researchers inform local residents about studies in their area

Activity: (Brewer) In 2008, ten talks were given in Unalaska with approximately 300 total attendance to bridge the gap between community members and researchers. Impact Statement: The primary impact of this ongoing series is a trust that has developed between locals and researchers where locals receive information from researchers, and also provide information to the researchers. Prior to this series, locals believed researchers were being secretive by not sharing their work and the impacts. This series has brought to light that researchers are willing to put in the time to talk about their research and that local input is valuable. Local organizations are competing to host this series to include the Museum of the Aleutians, the Grand Aleutian Hotel, the World War II Interpretive Center, and the local high school auditorium. The secondary impact of this series is that, for many of the researchers, locals attending these talks become future contacts for follow-up information and assistance. As an example, in 2008, Philip Loring (University of Alaska Fairbanks Department of Anthropology) gave a talk on "The impacts of climate change on coastal resources." Many stakeholders attended this talk and follow-up interviews were held with interested participants. In July 2009, Loring returned to Unalaska and used those same stakeholders for input about another project dealing with "The impacts of crab rationalization on local fishermen." *[A/152-20 (cli edu)]*

1114 ALASKA: Alaska Sea Grant monitored the spread of invasive species

Activity: (Freitag) The Alaska Sea Grant Marine Advisory Program participated in monitoring programs for invasive species sponsored by the Alaska Department of Fish and Game, the Smithsonian Environmental Research Center, and the NOAA Office of Protected Resources. MAP currently monitors for European green crab and invasive tunicates and bryozoans. The 2008 monitoring did not document the presence of European green crabs in Southeast Alaska. It did, however, document the spread of Botrylloides (of Japan origin), a type of invasive, encrusting tunicate that can be a serious threat to shellfish. One colony was recovered on oysters at a shellfish farm at Metlakatla. This knowledge will be important for the emerging Alaska shellfish industry and will help in developing procedures to reduce the risk to cultured species. Impact Statement: Alaska Sea Grant documentation of the spread of invasive tunicates in Southeast Alaska, and extension of information and identification techniques to local shellfish farmers, has enabled growers to more closely and accurately monitor their shellfish products for signs of the species. *[A/152-20 (inv mon edu)]*

1217 CALIFORNIA: Walkable Map Shows Offshore Marine Life & Habitats

2008--California Sea Grant contributed expertise and funds to help create an educational, walkable map at a popular local beach, La Jolla Shores, in San Diego County. The site is used as a destination for many educational camps and field trips for students, as well as being a popular vacation destination. The map is a 2,300-square-foot rendering of the offshore bathymetry, and is imbedded with flat bronze sculptures (that can be used for paper and pencil rubbings) of more than 50 native sea creatures. The life-sized, accurately colored sculptures are keyed to color photos with IDs on the nearby restroom wall at La Jolla Shores' Kellogg Park. California Sea Grant donated $5,000 toward the $350,000 marine science educational project, which the UCSD Birch Aquarium at Scripps (along with many other organizations) is incorporating into its educational program. *[C/P-1 (edu)]*

111 CONNECTICUT: Connecticut Sea Grant Fosters Aquatic Invasive Species (AIS) Awareness and Education

A series of educational resources and ten activities focused on the Atlantic Coast "Top Ten" AIS were completed for adaptation to the web and inclusion on the website: www.sgnis.org/kids. The content of the "Nab the Aquatic Invader!" website, developed and maintained by IL-IN Sea Grant, is being expanded to include AIS from throughout the United States, through a collaboration of the IL-IN, CT, LA, NY, and OR Sea Grant Programs. The new sections of the website are expected to go "live" the summer of 2008. "Nab the Aquatic Invader" workshops were hosted by CTSG and AIS-related resource materials were distributed to K-12 formal and informal educators in Connecticut participating in several workshops. Impact: • Students (grades 4-10) can locate information and complete self-directed activities relating to AIS found along the Atlantic Coast (as well as the Great Lakes, Gulf Coast, and West Coast) on the "Nab the Aquatic Invader" website. The web-based activities incorporate concepts of science, math, geography, music, writing, and history, to teach about AIS, their ecological and economic impacts, pathways of introduction, and control methods. • 66 fifth-grade students and their teachers investigated and identified live marine invasive species during UCONN Marine Sciences Day and learned of the pathways by which marine species travel. • 75 high school students and teachers from 23 Connecticut schools were trained to identify marine invasive species and their pathways and impacts as part of the Aquatics subject-area preparation for the 2008 Envirothon competition. • A 7th grade student from St. Lawrence School (West Haven CT) earned Honorable Mention for her 2008 science fair project on how invasive species affect Long Island Sound, using resources provided by CTSG. • 24 members of the general public attending Cornucopia festivities sponsored by the UCONN College of Agriculture & Natural Resources learned about marine invasive species and their impacts, and observed/handled various live specimens. • 92 formal and informal educators obtained AIS-related resource materials produced by CTSG in 2007-2008, as part of their participation in CTSG workshops or by direct request. • Five (5) Connecticut-based marine education organizations distributed CTSG's AIS-related materials to teachers participating in their programs, expanding the reach of CTSG-generated resource materials. *[(inv edu train)]*

556 CONNECTICUT: Sea Grant shares marine science with children in urban community shelter

Connecticut Sea Grant partnered with a local shelter on Project Sea Urchin: Reaching Hidden Youth with Marine Education. The program introduced 35 youngsters and 15 teens to the outdoors and educated them about the marine and coastal environment. Most were residents confined to a shelter for victims of domestic violence and some had never seen a beach or sea creature. A presentation on the project at a National Fish and Wildlife conference brought awareness of the need to other agencies such as Connecticut Department of Environmental Protection who are now working with these â€invisibleâ€™ youth as part of our stateâ€™s â€No Child Left Insideâ€ program. *[E/T-11 (edu edu)]*

564 DELAWARE: Coast Day Helps Public Make a Coastal Connection

Delaware Sea Grant and the UD College of Marine and Earth Studies hosted the 32nd annual Coast Day event, held to highlight the regionâ€™s coastal resources. The 2008 Coast Day theme was â€Coastal Challenges â€" Coastal Solutionsâ€ and featured interactive displays to help visitors better understand coastal challenges and their role in addressing them. Impact: Coast Day attracted 11,000 visitors. *[A/I-5 (ebm edu)]*

28 MICHIGAN: Great Lakes and Natural Resources Camp Influences Future Interests

Seventy-four young people from 28 Michigan counties participated in the 2007 4-H Great Lakes and Natural Resources Camp, supported in part by Michigan Sea Grant. Camper enrollment increased 57 percent since 2003. Held at Camp Chickagami near northern Lake Huron, the weeklong camp introduces young people, ages 13 to 15, to Michigan's natural resources through a variety of hands-on learning and recreation activities, which have been shown to stimulate participants' interest in natural resources and influence academic choices. More than 1,000 young people have participated in the camp since it began. *[(edu edu)]*

559 MICHIGAN: : Educational cruises teach families about Great Lakes stewardship

Michigan Sea Grant's Summer Discovery Cruises, a public vessel-based education program, hosted 1247 learners of all ages from 12 Michigan counties and 7 other states in 2008. The program successfully fosters greater public understanding and stewardship of Great Lakes resources. In 2008 17% of participants were returning learners, demonstrating a high level of satisfaction. As a result of a previous cruise, 88% of returning participants reported that they felt a greater responsibility for the Great lakes; 59% sought out more information; and 28% engaged in new stewardship activities. This program represents a seven-year collaborative effort involving Michigan Sea Grant, MSU extension and Huron-Clinton Metroparks. Since 2002, more than 5100 people have participated in 194 Summer Discovery Cruises. *[(edu edu)]*

560 MICHIGAN: Sea Grant Publications Promote Stewardship of the Great Lakes

Michigan Sea Grant distributed a total of 116,000 web and print publications to targeted users in 2008, including 12,000 copies of the upwellings newsletter, 3,500 pdf publications and 16,500 additional print publications from its bookstore. 84,000 visits were made to specific pages on Michigan Sea Grant's website. The website continues to grow as new sections are added about coastal habitats, climate change, medical waste disposal, and integrated assessment. Popular web pages about invasive species, fisheries, and Sea Grant's K-12 resources continue to draw visitors. *[(cli wq edu)]*

574 NEW YORK: Innovative Sea Grant educational programs feature a research cruise, workshops, and summits to â€œteach the teachersâ€ and their students about ongoing Great Lakes science research.

Through numerous workshops in western New York in which enthusiastic teachers received a new curriculum CD entitled The Greatest of the Great Lakes, a research cruise for educators on the US EPA vessel Lake Guardian in Lake Ontario, a workshop along the shores of Honduras, and the Great Lakes Student Summit, teachers received valuable training that is â€multipliedâ€ when brought back to the classroom. With third year funding from the Centers for Ocean Sciences Education Excellence (COSEE) Great Lakes, more than 4,200 students and teachers engaged in the educational experiences of a lifetimeâ€"those that will create the next generation of scientists and citizen stakeholders. *[A/EEP-33 (edu edu)]*

575 NEW YORK: Sea Grant encourages environmental stewardship in the Long Island Sound watershed

In 2008, Sea Grant joined Brookhaven National Laboratoryâ€™s Open Space Stewardship Program to increase student stewardship on Long Island. Working with several NY state agencies, Stony Brook University, and US EPAâ€™s LI Sound Study, high school and middle school students gathered data to help agencies address the problems of marsh loss and invasive species. Nearly 450 secondary school students from four different school districts engaged in hands-on science to collect useful data at four Long Island Sound locations. These activities included water sampling in a tidal creek, and activities to monitor invasive plants and shore crabs in Long Island Sound wetlands. *[A/EEP-33 (inv edu edu)]*

576 NEW YORK: With Sea Grant management, dune and river stewards increase public awareness of Lake Ontario resources

Using three strategies, the Eastern Lake Ontario Dune/Salmon River Steward Program effectively educates the public about NYâ€™s natural resources and the responsible use of publicly-accessible waterfront properties that boast rare and unique dune and wetland habitats. Each steward (undergrad or graduate student), in addition to monitoring assigned areas daily, developed a newspaper/media article, public education program, and project benefits summary. Their programs on the proper use, stewardship and protection of the fragile dunes area and the Salmon River corridor of Eastern Lake Ontario were attended by local groups: environmental, Americans with Disabilities and natural resource â€Friendsâ€ groups, youth, seniors, and shoreline property owners. Program topics were: invasive species (round goby, water chestnut, emerald ash borer); water flow and â€crittersâ€ of the lake and river. Local, regional and state print, TV and radio announced steward programs or featured articles. The

Steward program trains future leaders and provides program partners with a valuable resource; it is managed by NYSG and partners NYS Dept of Environmental Conservation (NYSDEC), NYS Office of Parks, Recreation & Historic Preservation, and The Nature Conservancy. *[A/EEP-33 (inv train edu)]*

1405 NEW YORK: New York Sea Grant's new informative CD on land use planning helps communities concerned with water quality

New York Sea Grant provided funding to Cornell University's Department of City and Regional Planning to help NYSG and Cornell Cooperative Extension develop an educational tool for local decision makers that give them the background they need to protect water quality while meeting other community goals of commercial and residential development. The final product is an educational CD that showcases four hypothetical communities based on four real New York communities; each case study projects growth using population data for the area and the resulting degradation of water quality under existing zoning. Alternative zoning and planning techniques are proposed for the four communities to permit the same amount of growth, while protecting water quality. The CD Land Use Planning: An Informative CD for Communities Concerned with Water Quality has been widely distributed throughout NY State (through Cornell Cooperative Extension) and is now being used by municipal officials, zoning boards and planners interested in smart growth. *[A/EEP-21 (edu wq)]*

479 NORTH CAROLINA: NC Local Officials Respond to Educational Programs

As a result of Sea Grant educational programs for coastal community officials on water quality, habitat degradation and other natural resource impacts associated with development, one county is critically evaluating existing zoning plan and other ordinances using a GIS-mapping and modeling exercise to predict water quality impacts of full build out. In addition, several counties have adopted low-impact development practices. *[A/EA-10 (wq edu mon mod)]*

1478 OREGON: Invasive Specie Awareness

It is still too early to assess impacts from this project. However, there are at least two results that are already leading towards measurable outcomes and impacts. This list will expand when the graduate student projects are completed. Although the publication on "How to Prevent the Spread of New Zealand Mudsnails" was completed in late June 2006, we have already received: 1) written memos from users that this publication has made them aware of AIS and AIS issues that were previously unknown to them; 2) A request for additional publications so they can alert colleagues and acquaintances about the problem and how to prevent AIS; 3) Requests from different organizations and agencies to adapt the publication to other regions. As a result of our initial trainings for marinas and ports and associated watershed groups, protocols are being adopted for awareness, inspection, and cleaning of boats and water gear before they enter water or move to other waterways. *[A/NIS-13-NSI-ANS (train edu inv)]*

1484 PENNSYLVANIA: Improving AIS Management in Pennsylvania

PASG took a leadership role to develop an aquatic invasive species management plan for Pennsylvania which was signed by Governor Rendell in December 2006 and approved by the federal ANS Task Force in February 2007. Educating natural resource professionals about AIS prevention techniques: Participants in workshops facilitated by the USFWS and PASG were introduced to the HACCP process to prevent the spread of AIS. These workshops for fishery and conservation agencies helped in identifying control measures to prevent the spread of invasive species through their management and enforcement activities. The workshop resulted in the training of 65 participants who passed on the training and information to their staff and colleagues. The workshops translated into several management actions: • PFBC now specifies fish capture equipment that is legal to use with brood stock in Edinboro Lake that had been invaded by zebra mussels. • PFBC discontinued the practice of transferring emerald shiners from Lake Erie to inland waters in an effort to control the spread of invasive species and plan to limit steelhead production operations to the Lake Erie watershed to avoid the transfer of fish diseases to inland waters. • 79 percent of HACCP participants said they would take the information from the workshop and make management changes within their agencies. • Developed a curriculum and training and provided technical assistance to track and report Zebra and Quagga Mussels. Set a framework for monitoring additional species. • Pennsylvania Sea Grant in collaboration with New York and Vermont Sea Grant,and Cornell College of Veternary Medicine received funding from USDA to conduct two HACCP and VHS technology workshops in conjunction with the Northeastern Aquaculture Association. *[A/ (dis train inv edu)]*

558 TEXAS: Texas Sea Grant provides an incentive for high school students to learn about coastal and marine science

2009 - Texas Sea Grant hosted the northern Texas Regional National Ocean Sciences Bowl. This college bowl-style competition pits teams of four high school students and one alternate against each other to answer questions from all disciplines of marine science. Fifteen teams, many of them from schools that had never before participated, competed on the Texas A and M University campus on February 23, 2008. Seventy-five high school students, many of them from areas hundreds of miles inland from the coast, including the Dallas/Fort Worth metroplex, studied coastal and marine science to prepare for the competition. As the competition is held annually, a similar number of students, many of them new to the competition, will prepare to participate each year. *[M/M-1 (edu edu)]*

1651 WISCONSIN: Sea Grant Leads Fox River TMDL Public Involvement and Outreach

At the request of U.S. EPA, Wisconsin Sea Grant's water quality specialist organized and chairs a TMDL Public Involvement and Outreach Committee to develop a public education and participation strategy for the Lower Fox River TMDL. The group has identified and interviewed targeted audiences, developed key messages and outreach materials, organized stakeholder sessions and a public meeting, conducted a Social Indicators Survey of all dairy producers in the basin, reviewed draft plans and made numerous public presentations and media interviews. In addition, the specialist organized two TMDL sessions for regional conferences (Fox-Wolf Watershed Stormwater Conference held in March 2007 and the State of Lake Michigan Conference in October 2007). The group's efforts have been lauded by EPA as one of the best examples of TMDL outreach in the nation. If successful, the TMDL will substantially reduce

phosphorus and suspended solids loads from the Fox River, the largest tributary source of TP and TSS to Lake Michigan. *[A/AS-1 (edu wq)]*

1151 CALIFORNIA: Ecosystems-based Management for Common Thresher Shark

Fisheries resources such as thresher shark are commonly managed from the limited point of view of the domestic fishery. However, many large pelagic species have ranges that span international borders. As such, management must take in to account mortality introduced through the activities of all fisheries operating on a stock to effectively ensure sustainable harvest levels. The present study bridges this gap by providing data on the magnitude of commercial harvest of threshers in Mexican waters. In addition, the researchers describe, for the first time, the smaller-scale, but geographically extensive, artisanal fishery for threshers and other elasmobranchs along the Pacific coast of Baja California. Concurrent studies of thresher shark movement patterns are shedding light on the essential habitat used by the juvenile life-history stage of this species, and serve to identify potential threats from fisheries, as well as habitat-based management options. The primary impact of these studies, then, is that they will form the basis for an assessment of the combined effects of U.S. and Mexican fisheries on exploited elasmobranch stocks, and represent the first step towards a binational management plan. Thus, the research will contribute to the sustainability of these fisheries, and the economic welfare of U.S. and Mexican fishermen who depend upon them. Finally, the researchers believe that public education is a key element of shark conservation. Through their outreach efforts involving the Birch Aquarium, they are informing a wide public audience about shark conservation issues relevant to the Southern California Bight. *[R/OPCFISH-04 (edu ebm)]*

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related materials to teachers participating in their programs, expanding the reach of CTSG-generated resource materials. *[(inv edu train)]*

1293 ILLINOIS/INDIANA: IISG creates university course that inspires youth and informs larger community

In partnership with the University of Illinois Center for Teaching Excellence, IISG developed a new service-learning course in the Department of Natural Resources and Environmental Sciences. This class engages students in meaningful activities that extend learning into local community schools. Twenty-two university students enhanced their understanding about environmental concepts. They learned how to identify community assets, how to value diversity in underserved populations, and how to affect change. They developed leadership and communication skills to inspire environmental action in others. They taught children in four schools, with many different backgrounds and learning levels, about the problem of aquatic invasive species (AIS) and how to help prevent the spread. This learning culminated in a stewardship fair where students presented their AIS educational projects developed through partnerships with local community organizations. *[A/SE-09-06 (edu inv)]*

1300 ILLINOIS/INDIANA: IISG inspires learning and action to prevent the spread of AIS

Nab the Aquatic Invader! is a web-based educational program to direct attention to the issue of aquatic invasive species (AIS) and inspire action. Over 200 teachers from the Pacific Northwest, the Gulf, Mid-Atlantic, North Atlantic, and Great Lakes regions learned about AIS in their region and the roles people can play in preventing new introductions and further spread. These teachers reach between 5,000 to 30,000 students each school year, who will now be informed about AIS and their economic and ecological impacts. At least 5,000 students have learned how they can be stewards of their waterways through new online teacher-developed activities. Another 1,000 students have been involved in stewardship activities that inform the local community about this issue. *[A/SE-09-06 (edu inv)]*

89 MICHIGAN: COSEE Lake Huron Exploration Workshop Enhances Classroom Learning

Twenty educators and 14 scientists participated in a weeklong COSEE Lake Huron Exploration Workshop, organized and hosted by Michigan Sea Grant. The workshop was the second of five annual COSEE exploration workshops, the first to be held in Michigan. The Lake Huron Exploration Workshop helped establish and strengthen working relationships between educators and Great Lakes research scientists. Average pre-workshop educator scores regarding knowledge of Lake Huron and the Great Lakes were 2.4/5.0, while post-workshop scores were 4.1/5.0. Following participation, 90 percent of the 20 educators indicated that they planned to incorporate Great Lakes concepts and information from the workshop into their classroom on a regular basis as class topics allow—a change that could potentially reach hundreds of students. In addition, several participants shared COSEE Great Lakes information with colleagues at workshop presentations including the Michigan Science Teachers Association conference, and the National Marine Educators Association conference. *[(edu edu)]*

1351 MICHIGAN: Advancing Great Lakes Literacy & Stewardship

Michigan Sea Grant Extension, through its two vessel-based education programs - the Great Lakes Education Program, involving students and teachers, and Summer Discovery Cruises, involving free choice learners - have demonstrated that program participation increases participant knowledge relating to the Great Lakes, increases a participant's personal sense of responsibility for the Great Lakes and, for a significant percentage of participants, fosters engagement in new Great Lakes stewardship activities. *[E/GLE-21 (edu)]*

146 NORTH CAROLINA: Students Receive Hands-On Estuarine Education

In spring 2008 and spring 2009, North Carolina Sea Grant researchers took, in total, 840 eighth graders and their teachers out on the Neuse Estuary aboard our research ship, the RV Humphries. The students received hands-on education about water quality assessment and also were given handouts and other instruction about how land-use changes in the watershed influence estuarine water quality. The feedback from the students and teachers has been highly favorable, and pre-/post-evaluation scores indicate that this educational experience significantly increased students' knowledge about the Neuse ecosystem and the strong relationship between land use changes and receiving water quality. *[R/UC-1 (edu edu wq ebm)]*

147 OHIO: Sea Grant Works to Increase Great Lakes Ecosystem Literacy

Sea Grant assisted the International Association for Great Lakes Research (IAGLR) to develop the IAGLR fact Sheet, Great Lakes: At a Crossroads. The Executive Director of IAGLR, Dr. Bob Sweeney, used the fact sheet to increase awareness of Great Lake ecosystem issues. He also used it to increase awareness of IAGLR to the news media. He used it to promote cooperation between IAGLR and other organizations interested in the Great Lakes. Others have used the fact sheet in there classroom teaching. *[A/EP-1 (edu edu)]*

1479 OREGON: Master Watershed Program Moves Beyond Oregon Borders

Oregon Sea Grant's Master Watershed Steward (MWS) program has been delivered to watershed groups and citizens interested in watershed enhancement for the past seven years. Many impacts have been recorded in relation to people conducting field projects: Teachers apply their watershed steward training in their classrooms where class projects improve their community watersheds; local government, citizen groups, and business leaders apply stewardship training in on-the-ground stream and wetland projects. Several report they have applied for and received grant funding to enhance their projects. Surveys were sent to states who purchased an MWS Learning Guides or requested information on how we organize and deliver our program. Seventeen surveys were completed from ten different states and Mexico; eleven indicated they have used the materials and have delivered some type of watershed related program. Three states have active watershed stewards programs based on Oregon materials and experiences: Arizona, North Carolina and Texas which are multiplying the efforts of success. *[A/ESG-7 (edu edu train ebm wq)]*

1508 RHODE ISLAND: First Science Summary for Narragansett Bay in 20 years published

In early 2008 Rhode Island Sea Grant delivered the first science summary of Narragansett Bay (Kremer & Nixon, 1973), and the first comprehensive description of the bay in book form (Hale, 1983), in 20 years. This publication, as described earlier in this report, has been incorporated into the management and decision-making framework for various Rhode Island agencies. It has also sparked the Narragansett Bay Estuaries Program to initiate an “update symposium” that will focus on new science results for Narragansett Bay, and is serving as a model for the development of a similar volume for Long Island Sound (Yarish et al., in preparation). *[E/G-061 (ebm edu)]*

278 CALIFORNIA: Copper pollution and costs to boaters reduced

New regulations require 2,000 San Diego Bay boat owners to cut 76% of copper discharges by 2022. Sea Grant collaborated on research that showed it would cost recreational boat owners in San Diego Bay $20 million to convert non-toxic hull paints over seven years, but only $1 million if the transition was stretched over 15 years. Instead of a short and expensive timetable, boat owners will have a two-year education period, followed by a 15-year conversion period as recommended by Sea Grant research, potentially saving boaters 95% in costs. *[(wq wq educ)]*

1197 CALIFORNIA: Sea Grant Teaches Sustainable, Co-Management of Antifouling Pollution and Hull-Borne Invasive Species

Title: Sea Grant Teaches Sustainable, Co-Management of Antifouling Pollution and Hull-Borne Invasive Species Published technical report, Alternative Antifouling Strategies Sampler, disseminated 12 PSAs to 416 radio stations, and disseminated a total of 3507 diverse publications to U.S. and international audiences by mail, Internet site downloads, and meetings. 534 stakeholders and policy makers attended 15 public presentations. 2 radio interviews reached a total of 400,000 listeners. Sea Grant's information was included in 3 articles for 45,000 readers of SEA Magazine, 40,000 readers of The Log boating newspaper, and 1,100 readers of NOAA's "Information Exchange for Marine Educators" e-newsletter. 5305 Internet site viewers included 4335 U.S. and 970 international. Meeting and publication evaluations found that 71%-79% of respondents increased their capacity and 31%-34% stated intentions to use Sea Grant recommendations within 2 years for reducing antifouling pollution and for preventing transport of invasive species on boats kept in saltwater. *[A/EA-1 (edu wq inv)]*

268 HAWAII: Sea Grant establishes nearshore ecosystem restoration project in Waikiki

Hawaii Sea Grant initiated a multi-year project to work with the State Department of Land and Natural Resources, Waikiki Improvement Association, Waikiki Aquarium and other local partners to undertake a comprehensive restoration and maintenance of Waikiki Beach and the nearshore coral reef habitat. The project proposes to use periodic beach replenishment of "recycled" sand that is strategically removed from the nearshore coral reef. This activity may help to restore and maintain coral reef habitats that are presently buried in sand that has eroded offshore over decades of shoreline erosion activity. This beach replenishment effort would be combined with an education outreach program aimed at building awareness and stewardship among tourists, the local community, and key decision makers based on Hawaii Sea Grant's ReefTeach, ReefWatcher, ReefTalk and the Hanauma Bay Education Program. This would be a clear case of environmental restoration leading to economic, social, cultural and recreational opportunities. This project would also be a first, essential step in building an "aquarium without walls," in which a natural coral reef ecosystem with its attendant community of fish and invertebrates would be a strong attraction for tourists and Hawaii residents, provide recreational business opportunities and demonstrate Hawaii's commitment to habitat restoration. Impacts: 1) Hawaii Sea Grant secured two years of funding from the Harold K. L. Castle Foundation in September 2007 to hire a project coordinator to establish local citizen and tourist engagement programs in marine stewardship. Hawaii Sea Grant also established a Memorandum of Agreement in February 2008 with the Waikiki Aquarium to coordinate, whenever possible, the activities of our ocean science researchers, extension professionals and educators toward the ambitious goal of restoring and maintaining Waikiki Beach and the nearshore

coral reef habitat. Finally, Hawaii Sea Grant received a letter of endorsement from the Waikiki Improvement Association (WIA), a private, nonprofit organization dedicated to making Waikiki a great place to invest, work, live and play. In the letter, WIA stipulated that it will assist Hawaii Sea Grant in reaching its project goals by serving as a liaison and facilitator in developing collaborative partnerships among the various stakeholders including, but not exclusive to, businesses, the visitor industry, property owners, government, and residents. In addition, WIA is providing prime office space in the Waikiki Trade Center for the Sea Grant Waikiki Coastal Coordinator. 2) Hawaii Sea Grant hired Jennifer Barrett in June 2008 to serve as the Waikiki Coastal Coordinator. The extension agent identified key stakeholders to engage and then held introductory meetings with them to invite their participation and seek their input on the project. The stakeholders included the Surfrider Foundation, Oahu Chapter, Waikiki Community Center, Hawaii Ecotourism Association, Interpret Hawaii, Honolulu Star-Bulletin (Susan Scott Ocean Watch columnist), The Nature Conservancy of Hawaii, Malama Maunalua, Hawaii Ocean Observing System (HiOOS), National Marine Fisheries Service Pacific Islands Regional Office, State Department of Land and Natural Resources (Office of Conservation and Coastal Lands, Division of Aquatic Resources, Artificial Reef Program, Aquatic Invasive Species Coordinator, Local Action Strategy Coordinators). The agent also participated in the U.S. Coral Task Force meeting held in Kona in August 2008 to network and identify potential project partners, engaging additional stakeholder groups, formalizing several more partnerships within the Waikiki community. 3) The agent also identified potential funding opportunities to support project activities in Waikiki and submitted grant proposals to these funding agencies. The agent was successful in securing funding from the Hawaii Tourism Authority's Natural Resource Program. This funding leverages existing extramural funds from the Harold K.L. Castle Foundation and are being directed to launch a community stewardship program entitled Reef Watch Waikiki in spring 2009. 4) In lieu of planning for a Waikiki ReefTalk program, the agent co-coordinated an Ocean Awareness Training program for over 100 participants in partnership with the NOAA Hawaiian Islands Humpback Whale National Marine Sanctuary and eight marine conservation organizations. The 15-hour training took place twice a week in November 2008 and involved the coordination of 15 cooperating agencies. Lecture topics covered included marine mammals, sea turtles, Hawaiian culture, oceanography and geology, Hawaiian reef organisms, coral reef biology and ecology, water quality and marine debris. Field projects included reef surveys, sea turtle and monk seal interpretation, and marine mammal data management. The training was offered free of charge, open to the public, and designed for volunteers who have an interest in working in marine education or tourism. Participants who complete the training received a CORAL (Care of our Culture, Reefs and Animal Life) certificate. *[(res edu train)]*

1294 ILLINOIS/INDIANA: IISG engages the pet industry to prevent the spread of AIS

Release of aquatic pets by releasing individuals or by dumping whole aquaria frequently has been identified as a pathway by which invasive aquatic plants and animals have been introduced and/or spread. In the Great Lakes alone, there are at least 10 species that have become established that most likely were introduced via this pathway. Because of IISG actions, a nationwide information and education campaign called Habitattitude™ was developed in conjunction with the U.S. Fish and Wildlife Service and the Pet Industry Joint Advisory Council, and leading pet and aquarium dealers in both states have become partners in this campaign whereby vendors deliver science-based products and messages to their customers. As a result, 37 percent (202 of 550) of the pet stores in Illinois are helping spread the HabitattitudeTM message by displaying information on the campaign in their stores. In addition, two dealers took the added step and signed on as partners in the HabitattitudeTM campaign. *[A/SE-05-06 (edu inv)]*

1309 ILLINOIS/INDIANA: Sea Grant informs Legacy Act communities

The Great Lakes Legacy Act authorizes $270 million to remove hundreds of tons of contaminated sediment that has built up over the years and left some local waterways severely polluted. A number of communities are benefiting from this federal funding with many more under discussion. Throughout, Illinois-Indiana Sea Grant is on the ground, informing, educating, and supporting these communities as they go through this process. IISG has worked with communities to plan their next steps and consider how they can make the most of their newly cleaned-up environment. For example, IISG has helped foster community involvement and feedback in the development of an Ecological Restoration Master Plan for the Muskegon Lake and Ruddiman Creek shoreline. *[A/ (res wq edu)]*

272 LAKE CHAMPLAIN: Sea Grant invasive aquatic species (ANS) education and research efforts help slow invasive species arrival in the basin

Statement: LCSG ANS education and outreach efforts are the longest continuous education effort in the basin. Working with other agencies, we have increased awareness and initiated management measures to stop the spread of invasive aquatic species into the basin. Impact: The June 2008 State of the Lake summary reported no new invasive species have reached the lake since 2004. *[(inv educ)]*

1367 MICHIGAN: Sea Grant's Aquatic Invasive Species Expertise Benefits Outreach Programs and Policy Development

State of Michigan agencies, Great Lakes regional commissions, federal agencies, organizations and institutions recognize and value Sea Grant's research based contributions on aquatic invasive species (AIS) issues and seek Michigan Sea Grant's counsel and collaboration on significant efforts. In 2006-07, the Department of Environmental Quality asked Michigan Sea Grant to develop materials, conduct training and provide support for a boater education program called Clean Boats, Clean Waters (CBCW). During the two year pilot program, Michigan's CBCW volunteers made more than 2,000 personal launch site contacts with boaters, almost all of whom responded favorably to the message. In 2006-2007, staff members of Michigan's departments of agriculture, environmental quality and natural resources requested Sea Grant's assistance with developing a protocol to use in recommending additions to/deletions from the state's new legislatively adopted lists of prohibited and restricted species. Sea Grant's stakeholder workshop discussions provided guidance for developing the protocol and provided a basis for work on updating the state's AIS management plan. *[A/FP-1 (train edu inv)]*

256 OREGON: Oregon Sea Grant A Major Player in Spreading the Word on Aquatic Invasives

When Oregon Sea Grant embarked on the journey to protect Oregon's waterways from nasty aquatic invasives we had no idea of the momentum and interest that would build as awareness of the issue and the battle cry of partners took hold across the state and nation. From the schoolteachers who 'humanely released'? classroom specimens like the rusty crayfish into local waters, to the classroom supply houses that shipped aquatic invasive critters to teachers nationwide; from the recreational stream fisherman to

the US Forest Service fire fighter who had no clue their boots could spread the New Zealand Mudsnail in Oregon's waterways-- a change is happening. A crusade to educate and take action is spreading nearly as fast as the invasives! Partners are numerous -- government and non-government agencies, institutions, watershed councils, teachers, pet stores, recreationists, environmentalists, college to grade school students and general citizens. We have had to reprint thousands of Oregon Sea Grant-created posters, brochures, and publications due to the demand. Requests for the 'do not release'? brochure and poster for classroom AIS are used not only in Oregon, Washington and California but Arizona, Iowa, Louisiana, Illinois and Florida. The New Zealand Mudsnail Prevention publication has been reprinted and distributed in Scotland, Canada and New Zealand. Early impacts are occurring. Classroom students recognized that rusty crayfish were being used in their classrooms; teachers no longer release the animals but are using the situation as learning opportunities to research the species and learn about the impacts of invasives; and new classroom curriculum is being developed on invasives. The mudsnail prevention guides used by fly-fishing clubs in public events resulted in early detection in the Tillamook Bay area allowing agencies to post signs and prevention information to minimize further spread. The US Forest Service reports they developed region-wide protocols for their fire personnel using the prevention guide. And, Oregon's Invasive Species Council reported that 'None of the organisms on the 100 worst list became established in Oregon in 2007.'? A result that Oregon Sea Grant and its partners hope to repeat in 2008's report. *[A/ESG-7 (inv train edu edu)]*

1486 PENNSYLVANIA: Preventing Boater Pollution

Distributed approximately 3,500 bilge socks and associated outreach materials to boaters across Pennsylvania as a pollution prevention measure. Each bilge sock can absorb 1.5 quarts of oil; the project has the potential to prevent 5,250 quarts of oil from entering Pennsylvania's waterways. *[A/ (wq edu)]*

241 TEXAS: Texas Sea Grant restores marshlands (2008)

Texas Sea Grant's Jefferson and Chambers counties coastal and marine resources extension agent conducted 18 field laboratory experiences for 411 adults and 21 field labs for 645 young people for a total of 4,224 contact hours. The trips were aboard the Waterborne Education Center boats on the Trinity River out of Anahuac. Funding came from various source, primarily grants procured by WEC. During two youth and one adult field trips conducted by the agent, the groups restored wetlands by planting one half acre of marsh in the Trinity Bay System. *[A/F-1 (train edu edu res)]*

1602 WASHINGTON: Sea Grant leads efforts to enhance environmental benefits of Puget Sound commercial and recreational shellfish harvests

In south Puget Sound, Washington's top molluscan shellfish production area, Sea Grant recruited and trained volunteers to remove debris, reclaim acres of tidelands and improve availability of clams and oysters for public harvest. Tribal, state agency and shellfish industry partners joined with Sea Grant and dozens of community volunteers in workshops, field trips and enhancement activities to provide additional public shellfish resources and increase shellfish filtration of the Sound. Impact: Fifteen acres of shellfish beds have been restored and are now more accessible to the public and tribal harvesters.

The shellfish industry and shoreline homeowners are better educated to deal with water quality issues, and some have decided to upgrade their septic systems. *[A/FP-7 (train res wq edu)]*

1638 WASHINGTON: Sea Grant supports assessment and public understanding of dam removal impacts

Dam removal projects have become a popular approach to restoring the habitats of river ecosystems. As a dam ages over time, its negative impacts on river and nearshore communities may outweigh its benefits. However, the full range of effects from restoration is not fully understood. Sea Grant research has collected high-resolution bathymetry, seabed-characterization and sediment-transport data on the Elwha River delta to begin investigations on the dispersal of dam-impounded sediment into the surrounding ecosystem. The information also is being used in public outreach to explain environmental forces that cause sediment to move and cause erosion and deposition. Impact: Agencies involved in baseline monitoring prior to the Elwha Dam removal are making use of Sea Grant data as detailed bathymetry and surficial-materials maps in their assessment of existing habitats. In addition, the public has a better understanding and access to more information to make important decisions on restoration projects. *[R/ES-65 (res edu mon mod)]*